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AUTOMATIC OPENING AND CLOSING DEVICE OF FLUSH VALVE FOR A FLUSH  
TOILET

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[There are no amendments to this utility model.]

Brief description of the figures

Figure 1 is a front view of the relay device part in the present model. Figure 2 is a partially cut front view of the main part. Figure 3 is a circuit diagram.

Detailed explanation of the model

A conventionally known flush valve for a flush toilet known is constructed as follows: a handle attached to the valve mechanism is pressed so as to push and move a push rod connected to the valve mechanism, which is pressure welded with a spiral spring onto the base face of said handle; thereby the valve is opened and water is allowed to flow out. Thus, there are drawbacks such as follows: Complex inconvenience of pressing the handle is required; and the system may give a feeling of uncleanness.

The present model pertains to an automatic opening and closing device of a flush valve for a flush toilet designed under the objective of removing the aforementioned drawbacks. Next, it will be specifically explained by referring to figures.

In the figures, (1) is a body that contains a relay device (2). On said body (1), elbows (3) and (4) are protrudingly installed. Light source part (6) formed by a light bulb (5) at the tip of one elbow is set opposite to a light intercepting part (8) comprised of a photoelectric transistor (7) at the tip of the other elbow. Said light bulb (5) and photoelectric transistor (7) are connected to the relay device (2) through the arm pipes (3) and (4). (9) is a transistor for amplification of the relay device (2). The base of said transistor (9) is connected to the emitter of the aforementioned photoelectric transistor (7) as well as being connected to the negative terminal of a rectifier (11) through a leak resistor (10). Further, the emitter of said transistor (9) is connected to the positive terminal of the rectifier (11); while the collector is connected to the negative terminal of the rectifier (11) through the coil (12) of the relay. Further, the collector of the aforementioned photoelectric transistor (7) is connected at a point between voltage dividing resistors (13) and (14), which are inserted in series between the positive and negative terminals of the rectifier (11). (15) is a smoothing capacitor inserted between the positive and negative terminals of the rectifier (11); and (16) is a power source transformer having two secondary windings. One secondary winding of said power source transformer (16) is connected across the ends of the light bulb (5); while the other secondary winding is connected across alternating terminals of the rectifier (11). (17) are power source terminals to which the primary winding of the power source transformer (16) is connected through a fuse (18) and a switch (19). Further, (20) are electromagnetic coil connecting terminals connected across the primary winding of the power source transformer (16) through a relay contact (21). Then, (22) is a flush valve. As is already known, the push rod (24) provided to a release valve lever (23), which is a part of the built-in valve mechanism, has a tip usually separated from the release valve lever (23) by means of a spiral spring (25) attached around it, and when the push rod (24) is pressed, the release valve lever (23) is moved and water is allowed to flow out. (27) is a body mounted to the flush valve (22). In said body (27), an electromagnetic coil (28) connected to the aforementioned electromagnetic coil connection terminals (20) is provided; and a disc (31) at the tip of a driving lever (30) installed opposite to or planted to a mobile iron core (29) fitted through said electromagnetic coil (28) is allowed to be in contact with the disc part (26) on the base of the aforementioned push rod (24). (32) is a push button provided at the tail part of the body (27). A spiral spring (33) intervenes between this push button and the end face of the mobile iron core (29) so that the button is kept in a state of protruding from the body (27) regardless of the movement of said mobile iron core (29). At a time of problems such as a power outage, by pressing said push button (32), it will be possible to push and move the mobile iron core (29).

Now, if electric current is passed to the relay device (2) by connecting the power source terminals (17) to the power source, the light bulb (5) of the light source part (6) will light and send a light beam to the photoelectric transistor (7) at the light intercepting part (8). Then, current will flow to said photoelectric transistor (7); base current of the transistor (9) will flow; and at the same

time, collector current will also flow; thereby current will flow to the coil (12) of the relay and the relay contact (21) will be opened. If the aforementioned light beam is interrupted with a hand or the like, the current that flows to the photoelectric transistor (7) will decrease; and as a result, the base current of the transistor (9) will also decrease, which will decrease the collector current; thereby the relay will be opened, and the relay contact (21) will be closed. Current will flow to the electromagnetic coil (28) and absorb the mobile iron core (29); the driving lever (30) installed opposite to or planted to said mobile iron core (29) will act and press the base end of the push rod (24) that is in contact with its tip; thereby the tip of said push rod (24) will press the release valve lever (23). Consequently, the flush valve (22) will open by means of a known valve mechanism allowing water to flow out. Therefore, if the present model is attached to a flush toilet, by means of the simple operation of interrupting a light beam by holding a hand or the like in the space between the light source part (6) and the light intercepting part (8), which protrude from the body (1) that contains the relay device (3) [sic; (2)], the flush valve (22) will automatically open allowing water to flow out and flush the toilet. Unlike the prior art, a complex action such as adding force is not needed at all; and besides, the user will have no feeling of uncleanness. Further, since the handle part of a conventionally known flush valve can be easily replaced by the present model, there is also the convenience of being able to easily remodel existing flush toilets.

### Claims

Automatic opening and closing device of a flush valve for a flush toilet wherein an electromagnetic coil (28) is provided in a body (27); the tip of a driving lever (30) that is installed opposite to or planted to a mobile iron core (29) which is fitted through the coil, is allowed to be in contact with the base end of a push rod (24) of a flush valve (22); said electromagnetic coil (28) is connected to a relay device (2); in the relay device (2), a light source part (6) comprised of a light bulb (5) and a light intercepting part (8) comprised of a photoelectric transistor (7) are installed opposite each other; and when a light beam transmitted from the light source part (6) to the light intercepting part (8) is interrupted, the tip of the driving lever (30) of the aforementioned mobile iron core (29) operated by the relay device (2) will press the push rod (24).

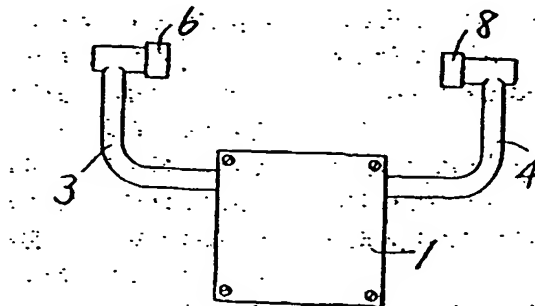


Figure 1

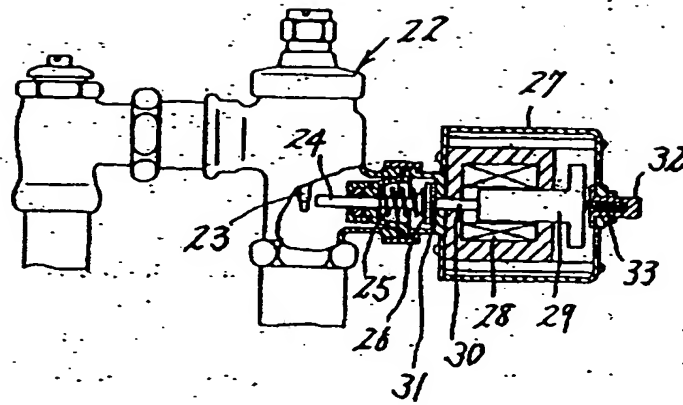


Figure 2

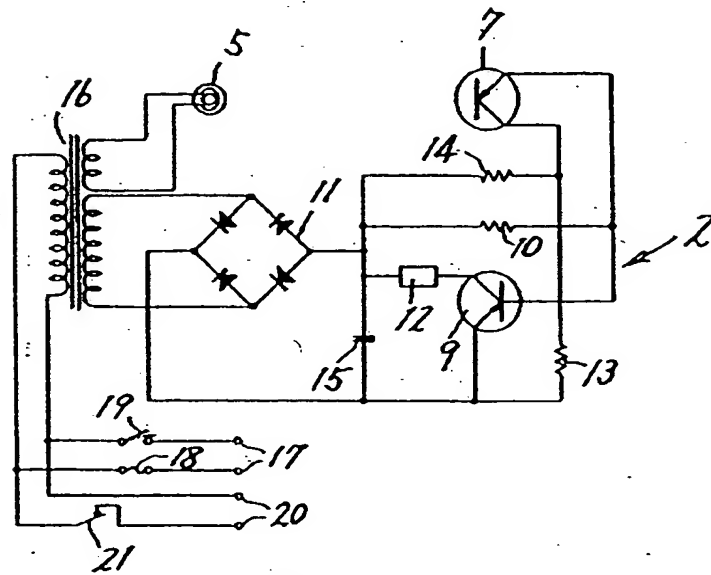


Figure 3

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(全3頁)

## 水洗便器用フラッシュバルブの自動開閉装置

## 図面の簡単な説明

第1図は本案におけるリレー装置部分の正面図、第2図は一部切欠要部正面図、第3図は回路図である。

## 考案の詳細な説明

従来知られる水洗便器用フラッシュバルブは弁機構に附設したハンドルを押圧することによつて該ハンドルの基端面に螺旋発条により圧接されている弁機構に関連した押棒を押し動かし、弁を開き出水させるものであるため、ハンドルを押圧する煩雑な手数を要すると共に不潔感を与える欠点があつた。

本案は前記のような欠点を除く目的の下に完成された水洗便器用フラッシュバルブの自動開閉装置に係るもので、以下図面について具体的に説明する。

図中1はリレー装置2を収納する函体であつて該函体1には腕管3, 4を突設してその各先端に電球5をもつて構成される光源部6と光電トランジスタ7をもつて構成される受光部8とを対向に設け、該電球5および光電トランジスタ7は腕管3, 4を通じてリレー装置2に結線される。9はリレー装置2における増幅用トランジスタであつて、該トランジスタ9のベースは前記光電トランジスタ7のエミッタと接続すると共にリーク抵抗器10を介して整流器11のマイナス端子と接続し、また該トランジスタ9のエミッタは整流器11のプラス端子と、コレクタはリレーのコイル12を介して整流器11のマイナス端子とそれぞれ接続させる。また前記光電トランジスタ7のコレクタは整流器11のプラス、マイナス両端子に直列に挿入された電圧分割抵抗器13, 14の midpoint と接続させておく。15は整流器11のプラス、マイナス両端子間に挿入した平滑用コンデンサであり、16は二次巻線を2組持つ電源トランスであるが、該電源トランス16の1組の二次巻線は電球5の両端に、他の1組の二次巻線は整流器11の交流流子に接続させる。17は

フューズ18、スイッチ19を介して電源トランス16の1次巻線の接続した電源端子であり、または20はリレー接点21を介して電源トランス16の1次巻線と接続した電磁コイル接続端子である。次に22はフラッシュバルブであつて、内蔵された弁機構の一部である逃し弁杆23に対して設けられる押棒24はこれに固装した螺旋発条25によつてその先端を逃し弁杆23と常時は離間した状態に保持させ押棒24を押すことによつて逃し弁杆23を動かし、出水させることは既知の通りである。27はフラッシュバルブ22に装着した函体であつて、該函体27内には前記電磁コイル接続端子20に接続される電磁コイル28を設け、該電磁コイル28に嵌挿させた可動鉄心29に対設または植設される駆動杆30の先端の盤部31を前記押棒24を基端の盤部26に接触させておく、なお、32は函体27の尾部に設ける押ボタンであつて、可動鉄心28の端面との間に螺旋発条33を介装し、該可動鉄心29の移動に関係なく常に函体27から突出した状態に保持させておき、停電その他の障害時に該押ボタン32を押すことにより可動鉄心29を押し動かすことができるようにしたものである。

今、電源端子17を電源に接続してリレー装置2に電流を通じれば、光源部6の電球5は点灯して受光部8の光電トランジスタ7に光線を送ることとなり、該光電トランジスタ7には電流が流れてトランジスタ9のベース電流が流れ、同時にコレクタ電流も流れてリレーのコイル12に電流が流れリレー接点21は開かれることとなるものであるが前記光線を手等をもつて遮れば、光電トランジスタ7に流れる電流は減少し、その結果、トランジスタ9のベース電流も減少してコレクタ電流を減少させ、リレーは開放されてリレー接点21は閉じられることとなり、電磁コイル28には電流が流れて可動鉄心29を吸引し、該可動鉄心29に対設または植設された駆動杆30は作動してその先端に接触している押棒24の基端を押して該押棒24の先端は

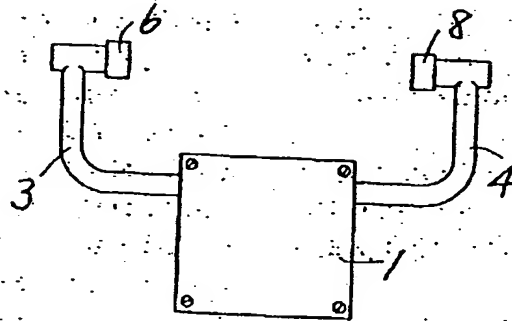
述し弁杆23を押すこととなるもので、ためにフラッシュバルブ22は既知の弁機構により開弁して出水させるものである。従つて、本案を水洗便器に附設しておけば、リレー装置3を収納する函体1から突設された光源部6と受光部8との間の空間に手等を差出して光線を遮るだけの操作によりフラッシュバルブ22は自動的に開弁して出水し便器を水洗するものであつて、既知のものにおけるような力を加える煩雑な手数を全く必要としないものであると共に不潔感も伴わないもので、また従来知られるフラッシュバルブにおけるハンドル部分のみを本案によつて簡単に交換できるから、既設の水洗便所の改造も容易に行える便宜があるも

のである。

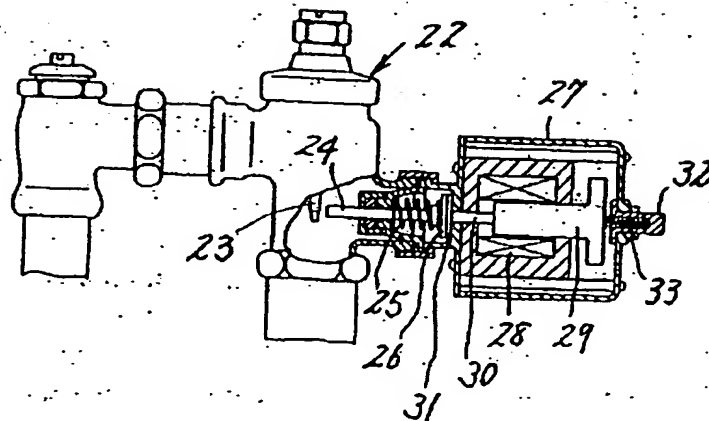
#### 実用新案登録請求の範囲

函体27内に電磁コイル28を設けてこれに嵌挿させた可動鉄心29に対設または植設される駆動杆30の先端をフラッシュバルブ22の押棒24の基端に接触させ、該電磁コイル28はリレー装置2に接続させてリレー装置2には電球5をもつて構成される光源部6と光電トランジスタ7をもつて構成される受光部8とを対向に設け、光源部6から受光部8に送られる光線が遮られたときにおいてリレー装置2により作動される前記可動鉄心29の駆動杆30の先端が押棒24を押すようにした水洗便器用フラッシュバルブの自動開閉装置。

第1図

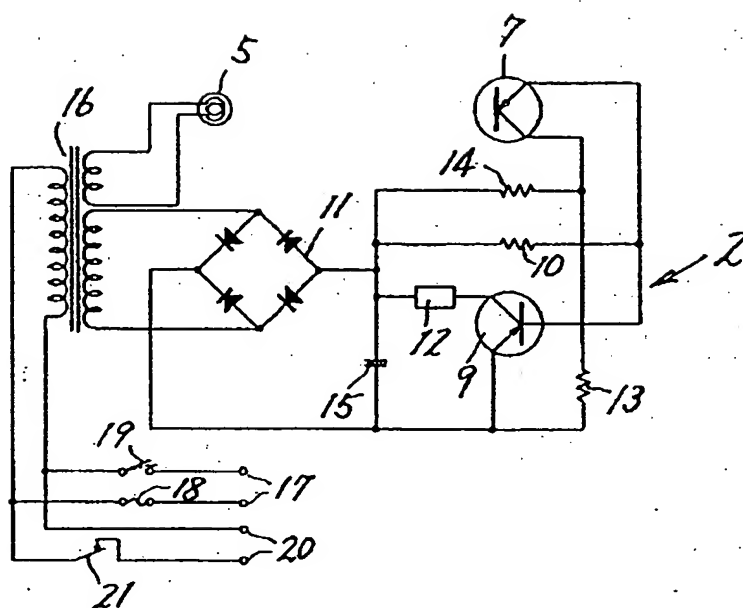


第2図





第3回



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